Biological Conservation 143 (2010) 2926–2936

Contents lists available at ScienceDirect

Biological Conservation

journal homepage: www.elsevier.com/locate/biocon

Do community-conserved areas effectively conserve biological diversity? Global insights and the Indian context

Ghazala Shahabuddin [a,*], Madhu Rao [b,1]

[a] School of Human Ecology, Dr. B.R. Ambedkar University, Dwarka Sector 9, Delhi 110 075, India
[b] Wildlife Conservation Society Asia Program, 2300 S. Blvd, Bronx, NY 10460, USA

ARTICLE INFO

Article history:
Received 26 November 2009
Received in revised form 15 April 2010
Accepted 21 April 2010
Available online 23 May 2010

Keywords:
Protected area
Communities
Conservation
Biological indicator
Forest management
Participation

ABSTRACT

The view that biodiversity-rich areas partially or largely managed by local residents, sometimes referred to as community-conserved areas (CCAs), can be effective in biological conservation has gained considerable ground over the past decade. In this paper, we review available scientific information on the conservation effectiveness of such areas globally. We compiled studies undertaken during the last 5 years (2004–2009) that use quantifiable ecological attributes to: (1) compare CCAs with strictly protected areas (SPAs); (2) compare CCAs with open-access ecosystems and (3) study trends in biological attributes of CCAs over time. We found that there were few consistent differences in diversity/species richness of flora or fauna protected under the two types of management or in deforestation rates. However, CCAs tend to harbour a species complement distinct from that of SPAs and show lowered abundances of monitored taxa that are of conservation importance. CCAs conserve biological values more effectively than open-access areas. Also, biological values tend to decline in CCAs over time. We conclude that CCAs could represent a significant improvement over open-access areas in terms of conservation effectiveness, yet fall short of the needs of comprehensive biological conservation. While extremely few studies have been undertaken in India, the trends seen largely concur with global ones. This review, based on a limited sample size, is only a beginning, and is expected to serve as an invitation for further research to address both the question of biological effectiveness of diverse forest governance regimes as well as the socio-economic, demographic and institutional reasons underlying these differences.

1. Introduction

The continued loss of global biodiversity and ecosystem services has fuelled much investigation into exploring the effectiveness of approaches that prevent ecosystem degradation and species extinctions while allowing for sustainable resource use (Adams and Hulme, 2001; Berkes, 2009; Terborgh and van Schaik, 2002). Protected areas represent a globally prevalent approach to stem biodiversity loss. They can range a spectrum from exclusive areas without people that are strictly protected by the state, to areas subject to intensive use and managed entirely by local communities. Over the past decade, the view that biodiversity-rich areas partially or largely managed by local residents, sometimes referred to as community-conserved areas (CCAs), can be effective in saving species from extinction, has gained considerable ground (Bray et al., 2003; Kothari, 2006).

India presents a special case with respect to CCAs – approximately 25% of the population depends to some extent on forest, wetland and coastal resources for their primary source of income and livelihoods (Milne, 2006). Within India, there exist several examples of ecosystems that are being managed partially or wholly by local residents such as the sizeable forestlands managed under community forest management (CFM) in the state of Orissa and Uttarakhand, joint forest management (JFM) in the province of West Bengal (India), and informal forest protection in Maharashtra and Orissa (Banerjee, 2007; Gadgil and Guha, 2007). Recent amendments in the Wildlife Protection Act of 1972 in India now allow for the category of community reserves in addition to national parks and wildlife sanctuaries (Pathak et al., 2004) which will allow access to and control by local residents.

While the specific motivations for CCAs vary considerably across sites, the common principle uniting these areas is the emphasis on local management, access and control. In CCAs, local users have much greater access to and control over ecosystem goods and services, in comparison with strictly protected areas (such as national parks) where human access to forest resources is restricted (Kothari, 2006).

* Corresponding author. Tel.: +91 124 2385584, +91 9958856933.
E-mail addresses: ghazalafarzin@yahoo.com (G. Shahabuddin), mrao@wcs.org (M. Rao).
[1] Contributed equally to the manuscript.

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doi:10.1016/j.biocon.2010.04.040

While CCAs are gaining importance as a solution to the problem of protecting natural diversity, there persists a deep dichotomy in the way biologists and social scientists tend to perceive their role (see Adams and Hulme, 2001; Madhusudan and Raman, 2003; Sheil et al., 2006). Social scientists see community-based conservation as a significant means of achieving social justice and livelihood goals because forest-dependent local residents tend to be socio-economically marginalized in most countries (Western and Wright, 1994; Schwartzman and Zimmerman, 2005). Revival of ecosystem resources with community support has been demonstrated to significantly improve dependent people's livelihoods (Nagendra, 2007).

A key assumption underlying the creation and recognition of CCAs is that when people are conferred ownership or management rights over ecosystem resources from which they can legitimately benefit, they will genuinely support conservation objectives in comparison to a situation of restricted access (Western, 2002; Rai and Uhl, 2004). A second assumption underlying the promotion of community governance is that people living in and around forests have a deep knowledge of local ecology; consequently their use of traditional harvesting techniques tends to minimise ecological damage (Western, 2002; e.g. Rai and Uhl, 2004; Pathak et al., 2004). Traditional knowledge of low-damage extractive practices is thought to go along with a deeper conservation ethic that is often intertwined with religious taboos and restrictions (e.g. Byers et al., 2001). Increased global support for the community-managed paradigm also stems from evidence of social injustice caused by the creation of strictly protected areas (SPAs) that restrict local residence, access and use (Brockington, 2002; Lewis, 2003; Johari, 2007; Sharma and Kabra, 2007).

In contrast, most biologists often contend that the complete flora and fauna of a region are likely to persist in the long-term only in strictly protected areas (hereafter referred to as SPA's; Terborgh and van Schaik, 2002; Silvertown, 2004). According to this view, unless natural resources are put under government ownership and strict protection, degradation and species loss will certainly occur. The following issues dominate the debate: (a) Any level of resource exploitation is intrinsically detrimental to the preservation of biological communities and hence sustainable use paradigms will ultimately harm nature, (b) conferring rights of use and protection of natural ecosystems to local people will likely detract from the primary goal of biodiversity conservation and wilderness protection given the changing lifestyles and aspirations of many communities (Terborgh, 1999, 2000), (c) while traditional harvesting systems may work well to meet subsistence needs of small populations, these systems often break down when commercial interests and dependent populations begin to expand.

At the core of the debate concerning the effectiveness of protected areas used or managed by communities in conserving biodiversity, lie complex issues of institutions and governance of common pool resources (Ostrom, 1990). Extensive collaborative research has resulted in a vast body of theory describing the range of socio-economic and environmental factors that affect the development, maintenance and performance of common-property institutions (Agrawal and Gibson, 1999; Burger et al., 2001; Ostrom, 2001; Pagdee et al., 2006). While the complex issues of resource use and governance cannot be represented satisfactorily by simple models (Ostrom and Nagendra, 2007), cross-site analyses will help investigate dominant trends that can give direction to conservation management and policy (Berkes, 2009).

Here we review quantitative and peer-reviewed studies to detect underlying global patterns in the biological effectiveness of areas that are used, owned or managed by communities. For purposes of this study, we refer to these areas collectively as community-conserved areas or CCAs as different from strictly protected areas (SPAs) and open-access areas that are unmanaged by any institution.

The review aims to answer the following specific questions:

(1) What is the comparative biological effectiveness of community-managed landscapes relative to landscapes managed under strict protection regimes?
(2) Do community-managed landscapes represent a significant improvement in biodiversity conservation over unmanaged or open-access areas?
(3) Is there an improvement of biological values in CCAs over time? and;
(4) How do observed patterns in India compare with global trends?

We emphasize that this review is a beginning in elucidating the status of knowledge on the potential and limitations of CCAs (as defined above) in biodiversity conservation. Currently, CCAs remain neglected in terms of both financial support and scientific attention in most developing countries (Kothari, 2006). Understanding the landscape-level contribution of CCAs to biodiversity conservation as well as their constraints, could also help place them on the national development agenda in countries such as India.

2. Materials and methods

A rigorous test of the conservation effectiveness of community-based conservation efforts is a quantitative comparison of the biological attributes of CCAs and SPAs within the same ecoregion. Other ways to assess the effect of community management on biodiversity are to analyze changes in biological indicators after community conservation has been instituted or to compare CCAs with similar habitat in which there is no management, tenure or protection of any kind (open access situations). Thus, we have sourced three types of studies to explore the extent to which CCAs can conserve natural biodiversity: (1) studies comparing biological attributes of CCAs and SPAs within the same ecoregion; (2) studies comparing biological attributes of community-managed areas with open-access (unmanaged) areas within the same ecoregion; and (3) studies that undertake an analysis of changes in biological indicators in CCAs over time. We acknowledge that there is tremendous diversity in key characteristics of SPAs, CCAs and open access sites related to institutions, governance and access and that our approach will not completely take into account this variability. However, there do exist some essential differences among these three categories that set them apart from each other, particularly in terms of access, control and type of management and therefore justify the use of these categories.

For the sake of simplicity and easier interpretation of biological indicators, we narrowed our study to terrestrial forest ecosystems in developing countries.

CCAs belong to one of three IUCN PA categories V, VI or VII which allow some degree of use (IUCN and UNEP, 2003). SPAs are classified under IUCN PA categories I, II, and III which either greatly restrict or eliminate human use apart from necessary management inputs and limited tourism. In this review, we utilize legal management categories to classify the sites under review rather than taking into account actual management practices. This implies, for instance, that an SPA might have limited or illegal resource use in contravention to its legal mandate or a CCA might contain no-take zones permanently or seasonally or open-access areas could be so remote that they may be inaccessible by default.

In this study, the SPA category included protected areas that were state-owned and managed, intact non-enriched forests, mostly without human habitation, with restricted or no utilization of resources and subject to illegal activities (Sudtongkong and Webb, 2008). CCAs could include sacred groves, indigenous re-